```
SQL> cl scr

SQL> SELECT * FROM Emp;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL
COMM     DEPTNO
---------- ---------- --------- ---------- --------- ---------- ---------
- ----------
      7839 KING       PRESIDENT            17-NOV-81       5000
10
      7698 BLAKE      MANAGER         7839 01-MAY-81       2850
30
      7782 CLARK      MANAGER         7839 09-JUN-81       2450
10
      7566 JONES      MANAGER         7839 02-APR-81       2975
20
      7654 MARTIN     SALESMAN        7698 28-SEP-81       1250
1400         30
      7499 ALLEN      SALESMAN        7698 20-FEB-81       1600
300         30
      7844 TURNER     SALESMAN        7698 08-SEP-81       1500
0         30
      7900 JAMES      CLERK           7698 03-DEC-81        950
30
      7521 WARD       SALESMAN        7698 22-FEB-81       1250
500         30
      7902 FORD       ANALYST         7566 03-DEC-81       3000
20
      7369 SMITH      CLERK           7902 17-DEC-80        800
20
      7788 SCOTT      ANALYST         7566 09-DEC-82       3000
20
      7876 ADAMS      CLERK           7788 12-JAN-83       1100
20
      7934 MILLER     CLERK           7782 23-JAN-82       1300
10

14 rows selected.

SQL> CREATE INDEX EmpEmpnoIDX
  2  ON Emp(Empno);
ON Emp(Empno)
       *
ERROR at line 2:
```

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```
ORA-01408: such column list already indexed


SQL> SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp;

     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7839 KING               10       5000
      7698 BLAKE              30       2850
      7782 CLARK              10       2450
      7566 JONES              20       2975
      7654 MARTIN             30       1250
      7499 ALLEN              30       1600
      7844 TURNER             30       1500
      7900 JAMES              30        950
      7521 WARD               30       1250
      7902 FORD               20       3000
      7369 SMITH              20        800
      7788 SCOTT              20       3000
      7876 ADAMS              20       1100
      7934 MILLER             10       1300

14 rows selected.

SQL> SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3  WHERE Empno = 7788;

     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7788 SCOTT              20       3000

SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3  --WHERE Empno = 7788
  4  /

     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7839 KING               10       5000
      7698 BLAKE              30       2850
      7782 CLARK              10       2450
```

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```
      7566 JONES              20        2975
      7654 MARTIN             30        1250
      7499 ALLEN              30        1600
      7844 TURNER             30        1500
      7900 JAMES              30         950
      7521 WARD               30        1250
      7902 FORD               20        3000
      7369 SMITH              20         800
      7788 SCOTT              20        3000
      7876 ADAMS              20        1100
      7934 MILLER             10        1300

14 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 3956160932

---------------------------------------------------------------------------
-
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time
|
---------------------------------------------------------------------------
-
|   0 | SELECT STATEMENT  |      |    14 |   644 |     3   (0)| 00:00:01
|
|   1 |  TABLE ACCESS FULL| EMP  |    14 |   644 |     3   (0)| 00:00:01
|
---------------------------------------------------------------------------
-

Note
-----
   - dynamic sampling used for this statement

SQL> ED
Wrote file afiedt.buf

  1  SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3* WHERE Empno = 7788
SQL> /
```

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```
     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7788 SCOTT              20       3000


Execution Plan
----------------------------------------------------------
Plan hash value: 2650221029

---------------------------------------------------------------------------
----------------------
| Id  | Operation                   | Name            | Rows  | Bytes |
Cost (%CPU)| Time     |
---------------------------------------------------------------------------
----------------------
|   0 | SELECT STATEMENT            |                 |     1 |    46 |
1   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| EMP             |     1 |    46 |
1   (0)| 00:00:01 |
|*  2 |   INDEX UNIQUE SCAN         | EMP_PRIMARY_KEY |     1 |       |
1   (0)| 00:00:01 |
---------------------------------------------------------------------------
----------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("EMPNO"=7788)

SQL> SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3  WHERE Empno > 7788;

     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7839 KING               10       5000
      7844 TURNER             30       1500
      7900 JAMES              30        950
      7902 FORD               20       3000
      7876 ADAMS              20       1100
      7934 MILLER             10       1300

6 rows selected.
```

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```
Execution Plan
----------------------------------------------------------
Plan hash value: 3956160932

-----------------------------------------------------------------------
-
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-----------------------------------------------------------------------
-
|   0 | SELECT STATEMENT  |      |     6 |   276 |     3   (0)| 00:00:01
|
|*  1 |  TABLE ACCESS FULL| EMP  |     6 |   276 |     3   (0)| 00:00:01
|
-----------------------------------------------------------------------
-

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("EMPNO">7788)

Note
-----
   - dynamic sampling used for this statement

SQL> ED
Wrote file afiedt.buf

  1  SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3* WHERE Empno = 7566 AND Ename = 'JONES'
SQL> /

     EMPNO ENAME          DEPTNO        SAL
---------- ---------- ---------- ----------
      7566 JONES              20       2975


Execution Plan
----------------------------------------------------------
Plan hash value: 2650221029
```

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```
-----------------------------------------------------------------------------
----------------------
| Id  | Operation                   | Name            | Rows  | Bytes |
Cost (%CPU)| Time     |
-----------------------------------------------------------------------------
----------------------
|   0 | SELECT STATEMENT            |                 |     1 |    46 |
1   (0)| 00:00:01 |
|*  1 |  TABLE ACCESS BY INDEX ROWID| EMP             |     1 |    46 |
1   (0)| 00:00:01 |
|*  2 |   INDEX UNIQUE SCAN         | EMP_PRIMARY_KEY |     1 |       |
1   (0)| 00:00:01 |
-----------------------------------------------------------------------------
----------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("ENAME"='JONES')
   2 - access("EMPNO"=7566)

SQL> ED
Wrote file afiedt.buf

  1  SELECT Empno, Ename, Deptno, Sal
  2  FROM Emp
  3* WHERE Empno = 7566 OR Ename = 'JONES'
SQL> /

     EMPNO ENAME                DEPTNO        SAL
---------- -------------------- ---------- ----------
      7566 JONES                        20       2975


Execution Plan
----------------------------------------------------------
Plan hash value: 3956160932

-----------------------------------------------------------------------------
-
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time
|
-----------------------------------------------------------------------------
-
```

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```
|   0 | SELECT STATEMENT  |       |     1 |    46 |     3   (0)| 00:00:01
|
|*  1 |  TABLE ACCESS FULL| EMP   |     1 |    46 |     3   (0)| 00:00:01
|
---------------------------------------------------------------------------
-

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("EMPNO"=7566 OR "ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> cl scr

SQL> SET AUTOTRACE OFF EXPLAIN
SQL> cl scr

SQL> SELECT * FROM Emp;

     EMPNO ENAME      JOB              MGR HIREDATE         SAL
COMM     DEPTNO
---------- ---------- --------- --------- --------- ---------- ---------
- ----------
      7839 KING       PRESIDENT            17-NOV-81       5000
10
      7698 BLAKE      MANAGER         7839 01-MAY-81       2850
30
      7782 CLARK      MANAGER         7839 09-JUN-81       2450
10
      7566 JONES      MANAGER         7839 02-APR-81       2975
20
      7654 MARTIN     SALESMAN        7698 28-SEP-81       1250
1400          30
      7499 ALLEN      SALESMAN        7698 20-FEB-81       1600
300           30
      7844 TURNER     SALESMAN        7698 08-SEP-81       1500
0           30
      7900 JAMES      CLERK           7698 03-DEC-81        950
30
```

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```
      7521 WARD       SALESMAN        7698 22-FEB-81       1250
500          30
      7902 FORD       ANALYST         7566 03-DEC-81       3000
20
      7369 SMITH      CLERK           7902 17-DEC-80        800
20
      7788 SCOTT      ANALYST         7566 09-DEC-82       3000
20
      7876 ADAMS      CLERK           7788 12-JAN-83       1100
20
      7934 MILLER     CLERK           7782 23-JAN-82       1300
10

14 rows selected.

SQL> CREATE INDEX EmpEnameIDX
  2  ON Emp(Ename);

Index created.

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename < 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
ADAMS              20       1100 CLERK
ALLEN              30       1600 SALESMAN
BLAKE              30       2850 MANAGER
CLARK              10       2450 MANAGER
FORD               20       3000 ANALYST
JAMES              30        950 CLERK

6 rows selected.

SQL> SET AUTOTRACE ON EXPLAIN
```

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```
SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 777873844

-------------------------------------------------------------------------------
------------------
| Id  | Operation                   | Name        | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
------------------
|   0 | SELECT STATEMENT            |             |     1 |    39 |     2
(0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| EMP         |     1 |    39 |     2
(0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN          | EMPENAMEIDX |     1 |       |     1
(0)| 00:00:01 |
-------------------------------------------------------------------------------
------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename < 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
ADAMS              20       1100 CLERK
```

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```
ALLEN                30        1600 SALESMAN
BLAKE                30        2850 MANAGER
CLARK                10        2450 MANAGER
FORD                 20        3000 ANALYST
JAMES                30         950 CLERK

6 rows selected.


Execution Plan
----------------------------------------------------------
Plan hash value: 777873844

-------------------------------------------------------------------------------
------------------
| Id  | Operation                   | Name       | Rows  | Bytes | Cost
(%CPU)| Time     |
-------------------------------------------------------------------------------
------------------
|   0 | SELECT STATEMENT            |            |     6 |   234 |     2
(0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| EMP        |     6 |   234 |     2
(0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN          | EMPENAMEIDX |     6 |       |     1
(0)| 00:00:01 |
-------------------------------------------------------------------------------
------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("ENAME"<'JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> SELECT Empno, Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Empno = 7566;

     EMPNO ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------- ---------
      7566 JONES              20       2975 MANAGER
```


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```
Execution Plan
----------------------------------------------------------
Plan hash value: 2650221029

---------------------------------------------------------------------------
----------------------
| Id  | Operation                   | Name            | Rows  | Bytes |
Cost (%CPU)| Time     |
---------------------------------------------------------------------------
----------------------
|   0 | SELECT STATEMENT            |                 |     1 |    52 |
1   (0)| 00:00:01 |
|   1 |  TABLE ACCESS BY INDEX ROWID| EMP             |     1 |    52 |
1   (0)| 00:00:01 |
|*  2 |   INDEX UNIQUE SCAN         | EMP_PRIMARY_KEY |     1 |       |
1   (0)| 00:00:01 |
---------------------------------------------------------------------------
----------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("EMPNO"=7566)

SQL> SELECT Empno, Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Empno = 7566 AND Ename = 'JONES';

     EMPNO ENAME      DEPTNO        SAL JOB
---------- ---------- ---------- ---------- ---------
      7566 JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 777873844

---------------------------------------------------------------------------
-----------------
| Id  | Operation                   | Name        | Rows  | Bytes | Cost
(%CPU)| Time     |
```

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```
-----------------------------------------------------------------------------
------------------
|   0 | SELECT STATEMENT            |             |     1 |    52 |     1
(0)| 00:00:01 |
|*  1 |  TABLE ACCESS BY INDEX ROWID| EMP         |     1 |    52 |     1
(0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN          | EMPENAMEIDX |     1 |       |     1
(0)| 00:00:01 |
-----------------------------------------------------------------------------
------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("EMPNO"=7566)
   2 - access("ENAME"='JONES')

SQL> SELECT Empno, Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Empno = 7566 OR Ename = 'JONES';

     EMPNO ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------- ---------
      7566 JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 837218515

-----------------------------------------------------------------------------
------------------------
| Id  | Operation                        | Name            | Rows  |
Bytes | Cost (%CPU)| Time     |
-----------------------------------------------------------------------------
--------------------------
|   0 | SELECT STATEMENT                 |                 |     1 |
52 |     2   (0)| 00:00:01 |
|   1 | TABLE ACCESS BY INDEX ROWID      | EMP             |     1 |
52 |     2   (0)| 00:00:01 |
|   2 |   BITMAP CONVERSION TO ROWIDS    |                 |       |
|          |          |
|   3 |    BITMAP OR                     |                 |       |
|          |          |
```

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```
|   4 |     BITMAP CONVERSION FROM ROWIDS|                 |       |
|            |          |
|*  5 |      INDEX RANGE SCAN            | EMP_PRIMARY_KEY |       |
|     1   (0)| 00:00:01 |
|   6 |     BITMAP CONVERSION FROM ROWIDS|                 |       |
|            |          |
|*  7 |      INDEX RANGE SCAN            | EMPENAMEIDX     |       |
|     1   (0)| 00:00:01 |
---------------------------------------------------------------------
---------------------------

Predicate Information (identified by operation id):
---------------------------------------------------

   5 - access("EMPNO"=7566)
   7 - access("ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> cl scr

SQL> DROP INDEX EmpEnameIDX;

Index dropped.

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 3956160932

---------------------------------------------------------------------
-
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time
|
```


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```
-----------------------------------------------------------------------
-
|   0 | SELECT STATEMENT  |      |     1 |    39 |     3   (0)| 00:00:01
|
|*  1 |  TABLE ACCESS FULL| EMP  |     1 |    39 |     3   (0)| 00:00:01
|
-----------------------------------------------------------------------
-

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> SET AUTOTRACE OFF EXPLAIN
SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER

SQL> CREATE INDEX EmpEnameIDX
  2  ON Emp(Ename);

Index created.

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER

SQL> DROP INDEX EmpEnameIDX;

Index dropped.
```

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```
SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER

SQL> CREATE INDEX EmpEnameIDX
  2  ON Emp(Ename);

Index created.

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER

SQL> DROP INDEX EmpEnameIDX;

Index dropped.

SQL> SET AUTOTRACE ON EXPLAIN
SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 3956160932

-----------------------------------------------------------------------
| Id  | Operation         | Name | Rows  | Bytes | Cost (%CPU)| Time
|
```

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```
-----------------------------------------------------------------------
-
|   0 | SELECT STATEMENT  |       |     1 |    39 |     3   (0)| 00:00:01
|
|*  1 |  TABLE ACCESS FULL| EMP   |     1 |    39 |     3   (0)| 00:00:01
|
-----------------------------------------------------------------------
-

Predicate Information (identified by operation id):
---------------------------------------------------

   1 - filter("ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> CREATE INDEX EmpEnameIDX
  2  ON Emp(Ename);

Index created.

SQL> SELECT Ename, Deptno, Sal, Job
  2  FROM Emp
  3  WHERE Ename = 'JONES';

ENAME          DEPTNO        SAL JOB
---------- ---------- ---------- ---------
JONES              20       2975 MANAGER


Execution Plan
----------------------------------------------------------
Plan hash value: 777873844

-----------------------------------------------------------------------
-----------------
| Id  | Operation                   | Name        | Rows  | Bytes | Cost
(%CPU)| Time     |
-----------------------------------------------------------------------
-----------------
|   0 | SELECT STATEMENT            |             |     1 |    39 |     2
(0)| 00:00:01 |
```

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```
|   1 |  TABLE ACCESS BY INDEX ROWID| EMP         |     1 |    39 |     2
(0)| 00:00:01 |
|*  2 |   INDEX RANGE SCAN          | EMPENAMEIDX |     1 |       |     1
(0)| 00:00:01 |
---------------------------------------------------------------------------
-----------------

Predicate Information (identified by operation id):
---------------------------------------------------

   2 - access("ENAME"='JONES')

Note
-----
   - dynamic sampling used for this statement

SQL> SPOOL OFF
```

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